

WHAT IS CLAIMED IS:

1. A regeneration system comprising:  
at least two microwave sources for producing microwaves;  
- a microwave cavity in communication with the microwave sources to receive the microwaves; and  
a particulate filter disposed in the cavity which is heated by the microwaves in the cavity.

2. A regeneration system as described in Claim 1 wherein the microwave cavity has multiple ports through which microwaves enter the microwave cavity.

3. A regeneration system as described in Claim 2 wherein the microwaves are fed through either waveguides or coaxial cables with wave launchers or electric or magnetic probes into the microwave cavity.

4. A regeneration system as described in Claim 2 wherein the microwave sources are protected by means for preventing reflected microwaves from reaching them.

5. A regeneration system as described in Claim 4 wherein the preventing means includes isolators or circulators or the particulate filter itself.

6. A regeneration system as described in Claim 2 including acoustic isolation for protecting the microwave sources from vibration damage.

7. A regeneration system as described in Claim 2 including means for protecting the microwave sources from exhaust and an engine for producing the exhaust connected to the cavity.

8. A regeneration system as described in Claim 7 wherein the exhaust protecting means includes windows disposed between the cavity and the microwave sources.

9. A regeneration system as described in Claim 2 including control means for turning the microwave sources on or off at desired intervals and in any desired sequence.

10. A regeneration system as described in Claim 2 including means for optimizing coupling of the microwaves from the microwave sources to the cavity and the filter.

11. A regeneration system as described in Claim 10 wherein the optimizing means includes 3-stub or iris tuners.

12. A regeneration system as described in Claim 2 including diagnostics are used to monitor the filter.

13. A regeneration system as described in Claim 12 wherein the diagnostics include thermocouples, optical pyrometers or imagers.

14. A regeneration system comprising:

at least one microwave source for producing microwaves;

a microwave cavity having a plurality of ports through which microwaves from the microwave source enter the cavity; and

*Sub. C2* *cont.*  
a particulate filter disposed in the cavity which is  
heated by the microwaves.

15. A method for regenerating a particulate filter  
comprising the steps of:

passing exhaust through the particulate filter; and

heating the particulate filter from a plurality of  
directions with microwaves.